

I claim:

CLAIMS

- 1 1. A capacitive sensing system comprising:
2 a field generating circuit operative to produce a sensing field signal
3 and to generate a capacitive sensing field, said sensing field signal
4 operative to change in response to an object moving within capacitive
5 sensing field; and
6 a monitor circuit in communication with said field generating
7 circuit operative to monitor said sensing field signal, said monitor circuit
8 comprising:
9 a reference signal counter operative to count and store
10 digital pulses that occur during a first cycle of said signal field signal
11 wherein said stored digital pulses correspond to a first digital value;
12 a field generator signal counter operative to receive and
13 store said first digital value from said reference signal counter, and
14 operative to begin counting down from said first digital value at each new
15 cycle of said sensing field signal, and operative to continue counting down
16 until said field generator signal counter equals zero or until said new cycle
17 ends, and operative to count to a second digital value that corresponds to
18 the difference between the number of digital pulses occurring during said
19 new cycle and the value stored in the reference signal counter; and
20 a threshold compare circuit operative to receive the
21 difference value and compare it to a predetermined value, and operative to
22 generate an object detection signal when said difference value exceeds a
23 predetermined threshold value.
- 1 2. The system of claim 1 further comprising a reference
2 signal counter clock circuit operative to cause said reference signal
3 counter to be incremented or decremented in response to
4 environmental changes.

1 3. The system of claim 1 further comprising an object
2 detection signal counter operative to receive said object detection
3 signal from said threshold compare circuit and generate an alarm
4 signal when said object detection signal counter exceeds a
5 predetermined count value.

1 4. The system of claim 1 wherein the field generator
2 signal counter is operative to begin counting up after counting
3 down to zero such that said second digital value is obtained.

1 5. The system of claim 1 wherein the field generating
2 circuit comprises a tank circuit, an oscillator and a sensing element.

1 6. The system of claim 1 further comprising at least one
2 alarm mechanism wherein said alarm mechanism comprises a
3 primary alarm for warning an intruder of detection.

1 7. The system of claim 6 wherein the at least one alarm
2 mechanism further comprises a secondary alarm that includes a
3 building alarm system.

1 8. The system of claim 1 wherein the monitor circuit is
2 complex programmable logic device (CPLD).

1 9. The system of claim 1 wherein the monitor circuit is a
2 microprocessor.

1 10. The system of claim 7 wherein the at least one alarm
2 mechanism includes a timer circuit that activates the secondary

3 alarm after single object detection signal has persisted beyond a
4 predetermined period of time.

1 11. The system of claim 1 further comprising a failsafe
2 circuit operative to activate said at least one alarm mechanism
3 upon detecting a fault in the system.

1 12. The system of claim 1 further comprising a tamper
2 detection circuit operative to activate the at least one alarm
3 mechanism in response to detecting tampering at the field
4 generating circuit.

1 13. The system of claim 1 further comprising a remote
2 field generating circuit operative to be selectably placed in
3 communication with the monitor circuit.

1 14. The system of claim 13 wherein the field generating
2 circuit is operative to automatically disconnect from the monitor
3 circuit upon detecting said remote field generating circuit.

1 15. The system of claim 1 further comprising a sensitivity
2 adjustment switch operative to allow for the sensitivity of the
3 system to be changed as desired.

1 16. The system of claim 15 wherein the sensitivity
2 adjustment switch is operative to be adjusted using a remote
3 control device.

1 17. The system of claim 6 further comprising an alarm
2 disabling circuit operative to allow for the at least one alarm
3 mechanism to be disabled during the desired time period.

1 18. The system of claim 1 further comprising an alarm
2 disabling circuit operative to allow for the at least one alarm
3 mechanism to be temporarily disabled for a predetermined amount
4 of time.

1 19. A method of object detection comprising the steps of:
2 providing a field generating circuit operative to produce a sensing
3 field signal and to generate a capacitive sensing field, said sensing field
4 signal operative to change in response to an object moving within
5 capacitive sensing field; and
6 providing a monitor circuit in communication with said field
7 generating circuit operative to monitor said sensing field signal, wherein
8 said step of providing a monitor circuit further comprises the steps of:
9 providing a reference signal counter operative to count
10 digital pulses and store a first digital value that corresponds to the number
11 of digital pulses counted during a first cycle of said signal field signal;
12 providing a field generator signal counter operative to
13 receive and store said first digital value from said reference signal counter,
14 and operative to begin counting down from said first digital value at each
15 new cycle of said sensing field signal, and operative to continue counting
16 down until said field generator signal counter equals zero or until said new
17 cycle ends, and operative to count to a second digital value that
18 corresponds to the difference between the number of digital pulses
19 occurring during said new cycle and the value stored in the reference
20 signal counter;

21 providing a threshold compare circuit operative to receive
22 said difference value and compare it to a predetermined value, and
23 operative to generate an object detection signal when said difference value
24 exceeds a predetermined threshold value; and

25 providing at least one alarm mechanism operative to receive
26 said alarm signal and activate at least one alarm device.

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28 20. The system of claim 1 further comprising a sensitivity adjusting
29 circuit operative to automatically adjusts the system sensitivity in response
30 to sensing a predetermined condition.

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